

## ROYAL BOTANIC GARDENS, KEW.

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OF

## MISCELLANEOUS INFORMATION.

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XXVII.—REVISION OF THE GENUS *CYANANTHUS*.

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*Introduction.* The difficulty recently experienced in identifying Chinese specimens of *Cyananthus* seemed to call for a revision of the genus. This work is based upon the fine series of specimens in the Kew Herbarium, which, in addition to all the "types" of the Himalayan species, includes duplicate "syntypes" \* of all except one of those from Western China described by Franchet. Unfortunately not all of Forrest's specimens are yet available at Kew, but owing to the courtesy of the Regius Keeper of the Royal Botanic Garden, Edinburgh, the major portion of this splendid collection was received on loan. All the specimens in the British Museum have also been examined.

The genus *Cyananthus* was at first placed in the *Polemoniaceae* by Bentham on account of the superior ovary, but was transferred to the *Campanulaceae* by Hooker and Thomson, and has its closest affinities with *Codonopsis* and *Campanumaea*; it is, however, a somewhat anomalous member of this family, and may possibly be an early type. The genus is well-marked, comprising a perfectly natural collection of species, which form an almost complete series of links in a chain connecting the extreme types, both in floral and vegetative characters. It does not, therefore, readily split into sections, but this is of little importance, for up to the present only twenty-one species have been discovered. Scarcely anything is known of the genetics of the genus, even of the species which have long been in cultivation, but it appears that the flowers vary much in size, this being to a large extent subject to "fluctuation". The shape of the calyx seems to be much more constant and the leaves provide

\* The terms now in use for the various kinds are explained in Journ. Bot., 1923, 137.

good diagnostic characters. Some of the most beautiful species which come from Yunnan and S.E. Tibet are as yet rarely seen in gardens.

The only important previous work exclusively devoted to *Cyananthus* is a series of three short papers by Franchet in Morot's *Journal de Botanique* i. (1887), where a good account of its affinities and the morphology of the flower will be found. This need not be redescribed here, as it is sufficient to mention that in those species in which the calyx becomes enlarged and subglobose after flowering, as the vascular bundles of the calyx become more conspicuous the hairs gradually become more sparse. To avoid confusion, therefore, the calyx of buds as well as of flowers should be examined. With the present knowledge of a much greater number of species the two sections, *Platylobi*, with shallow-lobed corolla, and *Stenolobi*, with lobes deeply incised, into which Franchet (op. cit. 258) divided the genus, are scarcely tenable; for *C. formosus* might be placed equally well in either section on the character of the corolla, and on the other hand some species would be separated that are in other respects closely allied. The subsidiary character of the density of the calyx indumentum which he used is scarcely sufficient to separate one variety of *C. incanus* from the first group, while the type of *C. incanus* was placed in the second group, and other species such as *C. longiflorus* are very variable in this respect.

*Distribution.* Formerly the genus *Cyananthus* was believed to be confined to the Himalaya, but the exploration of the high mountains of Western China in recent years has shown that the range of some species extends up through the province of Yunnan to Sze-chuan in Western China as well as northwards into Central Tibet.

Of the species known up to the present time thirteen are endemic in China, including those new species described here for the first time; while *C. inflatus* and *C. Hookeri* are Sino-Himalayan in their range; *C. incanus* and *C. lobatus* are found as distinct varieties in the two areas (the type of *C. lobatus* also occurring just over the Chinese frontier), and only four, *C. pedunculatus*, *C. cordifolius*, *C. integer*, and *C. microphyllus*, are confined to Northern India. The genus is confined to the interior of Asia, and it would appear quite probable that China, and not India, is its real home. In China the altitudinal range of the genus appears to be 6,000–14,000 feet; the upper limit being reached by *C. formosus* and *C. Hookeri* var. *hispidus* on the Lichiang Range, and *C. incanus* var. *leiocalyx* on the Tsang-chan mountains above Tali, both in the province of Yunnan, and the lower limit by *C. Forrestii* in the Ming Kwang valley, north of Ma Chang, Yunnan. In S.E. Tibet, however, *C. macrocalyx* var. *flavo-purpureus* was found at an altitude of 15,000 feet, and in Sikkim 14,000 feet is considerably exceeded, so that further exploration of the summits of the western ranges



of Sze-chuan may show that some of the species ascend in places somewhat higher than this; for very little collecting has been done at or above the snow-line in China, and although Sze-chuan is further North, the uppermost zone of vegetation there extends higher than in Yunnan.

### Distribution of the Species.

(The varieties are included under their species.)

	West Szechuan.	Yunnan.	Tibet.	East Himalaya.	West Himalaya.	Assam.
<i>C. lobatus</i> ...		X	X	X	X	
<i>C. fasciculatus</i> ...		X				
<i>C. lichiangensis</i> ...		X				
<i>C. flavus</i> ...		X				
<i>C. Hookeri</i> ...	X	X	X	X		
<i>C. inflatus</i> ...	X	X		X		X
<i>C. Forrestii</i> ...		X				
<i>C. Mairei</i> ...		X				
<i>C. formosus</i> ...		X				
<i>C. Delavayi</i> ...		X				
<i>C. dolichosceles</i> ...	X	X	X			
<i>C. pedunculatus</i> ...			X	X	X	
<i>C. macrocalyx</i> ...		X	X			
<i>C. incanus</i> ...	X	X	X	X		
<i>C. integer</i> ...					X	
<i>C. microphyllus</i> ...					X	
<i>C. petiolatus</i> ...	X					
<i>C. argenteus</i> ...		X				
<i>C. obtusilobus</i> ...		X				
<i>C. longiflorus</i> ...		X				

Except where otherwise stated, all the specimens quoted have been examined by the author. The figures accompanying this paper were drawn by Mr. J. Hutchinson, to whom the author tenders his best thanks.

**Cyananthus** Wall. ex Benth. apud Royle in Ill. Himal. Bot. 309 (1836); Hook. f. & Thoms. in Journ. Linn. Soc. ii. 19 (1858); Benth. & Hook. f. Gen. Pl. ii. 557 (1876); C. B. Clarke in Hook. f. Fl. Brit. Ind. iii. 434 (1881); Franchet in Morot Journ. de Bot. i. 257 (1887).

## KEY TO THE SPECIES AND VARIETIES.

All the leaves deeply trifid (or upper ones occasionally 5- or 7-fid); lamina of the upper leaves gradually narrowed into the petiole ..... 1. **lobatus**.

Leaves 15-25 mm. long ..... var. *lobatus*.

Leaves 5-10 mm. long ..... var. *Farreri*.

All the leaves entire or crenate-lobed, sessile or abruptly petiolate :

Flowers 3-4 together ..... 2. **fasciculatus**.

Flowers solitary :

Corolla yellow, uniform in colour throughout :

Peduncles 2-3 mm. long; calyx pilose; leaves subdeltoid, 8-10 mm. wide ..... 3. **lichiangensis**.

Peduncles exceeding 15 mm.; calyx glabrous; leaves elliptical, 6-7 mm. wide ..... 4. **flavus**.

Corolla blue (upper part more or less yellow in *C. incanus* and one var. of *C. macrocalyx*) :

Flowers very small, corolla typically less than 10 mm. in length ..... 5. **Hookeri**.

Stem glabrous :

Flowers 6-8 mm. long ..... var. *levicaulis*.

Flowers 12-15 mm. long ..... var. *grandiflorus*.

Stem hairy :

Branches 0.5-1 cm. long; calyx sparsely clothed with hairs ..... var. *hispidus*.

Branches usually more than 4 cm. long; calyx very densely clothed with hairs ..... var. *densus*.

Flowers larger, corolla exceeding 10 mm. in length :

Calyx much inflated after flowering :

Calyx hispid, teeth attenuate ..... 6. **inflatus**.

Leaves small; flowers deep blue :

Stem slender; almost glabrous

..... var. *tenuis*.

Stem stouter, more branched, and covered with rufous hairs ..... var. *rufus*.

Leaves large, membranous; flowers very pale blue ..... var. *sylvestris*.

Calyx nearly glabrous, teeth triangular

..... 7. **Forrestii**.

Calyx subcylindrical, not markedly inflated after flowering :

Leaves broader than long :

Lobes of the calyx obtuse, distant from one another, longer than the tube; leaves 4-10 mm. long

..... 8. **Mairei**.

Lobes of the calyx triangular, shorter than the tube ; leaves 2-4 mm. long :

Corolla tube 8-10 mm. broad ; apex of the caudex provided with rosulate scales

..... 9. **formosus**.

Corolla tube 6-7 mm. broad ; apex of the caudex without rosulate scales ..... 10. **Delavayi**.

Leaves longer than broad :

Flowers with peduncles 15-30 mm. long :

Calyx glabrous ; corolla-lobes narrow, oblong, subobtusate, 3-4 times as long as broad

..... 11. **dolichosceles**.

Calyx densely pilose :

Corolla divided to  $\frac{1}{5}$  into very broad obtuse lobes ; leaves subsessile, lanceolate

..... 12. **pedunculatus**.

Corolla divided to  $\frac{1}{2}$  into lanceolate lobes ; leaves sessile, cordate, clasping the stem

..... 13. **cordifolius**.

Flowers sessile or subsessile :

Leaves obovate to rhomboid :

Flowers 2.5-3.5 cm. long ; calyx teeth  $\frac{1}{6}$  -  $\frac{1}{4}$  as long as the tube ; caudex very woody

..... 14. **macrocalyx**.

Corolla uniformly purple, part above the calyx more than equalling length of calyx :

Calyx glabrous ..... var. *macrocalyx*.

Calyx hairy ..... var. *pilosus*.

Part of corolla above the calyx less than length of calyx, yellow above

..... var. *flavo-purpureus*.

Flowers 1.5-2.0, rarely 2.4 cm. long ; calyx teeth  $\frac{1}{3}$  -  $\frac{2}{5}$  as long as the tube ; caudex scarcely woody ..... 15. **incanus**.

Calyx  $2\frac{1}{2}$  times as long as broad ; leaves rarely more than 2.5 mm. broad

..... var. *parvus*.

Calyx twice as long as broad ; leaves usually 3-5 mm. broad :

Calyx densely covered with dark brown hairs ..... var. *trichocalyx*.

Calyx glabrous ..... var. *leiocalyx*.

Leaves lanceolate :

Calyx densely covered with fulvous hairs :

Leaves ovate-lanceolate, 4-8 mm. wide

..... 16. **integer**.



Leaves oblong-lanceolate, 1.5-3 mm. wide  
 ..... 17. **microphyllus**.

Calyx sparsely pubescent with pale hairs :  
 Leaves shortly pilose on both surfaces,  
 scarcely paler beneath, margin scarcely  
 recurved ..... 18. **petiolatus**.

Lower surface of the leaves densely hairy,  
 much lighter in colour than the upper,  
 margin distinctly recurved throughout :

Calyx teeth longer than the tube, lanceo-  
 late, acute, sinus deep ; flowers numerous,  
 terminal on very short lateral branches  
 ..... 19. **argenteus**.

Calyx teeth shorter than the tube :  
 Calyx teeth triangular, subobtusate,  
 sinus shallow ; flowers solitary, terminal  
 ..... 20. **obtusilobus**.

Calyx teeth narrowly triangular, acute ;  
 flowers terminal on short lateral  
 branches ..... 21. **longiflorus**.

1. **C. lobatus** Benth. *apud* Royle, Ill. Himal. Bot. t. 69,  
 fig. 1 (1836) ; Wall. Cat. 1473 ; Hook. f. et Thoms. in Journ. Linn.  
 Soc. ii. 19 ; Hook. f. Fl. Brit. Ind. iii. 433 ; Franchet in Morot  
 Journ. de Bot. i. 259.

var. **lobatus** (Benth.) Marquand.

PUNJAB. Kunawar ; 1886, *J. R. Drummond* 22199, 22200,  
 22211, 22212, 22213, 22214 ; without precise locality, *J. R.*  
*Drummond* 25256 ; Andra Pass, Chamba, *J. F. Duthie*. Simla :  
 Rotary Pass, 3900 m., *Herb. Collett* 182.

UNITED PROVINCES. Kumaon : *Wallich* 1473 (Anno 1830) ;  
 Ralam River, 3500 m., *R. Strachey & J. E. Winterbottom* ;  
 E. Kumaon, *Duthie*. Garhwal : *Herb. Falconer* 616 ; Taulea  
 under Srikanta, 3500-4000 m., Aug. 7, 1883, *J. F. Duthie*.

NEPAL. Gossainthan, *Wallich* ; Goshai Kund, 3600-4200  
 m., *Lieut. Lal Dhoj* 9 (approaching var. *Farreri*) ; "Central  
 Nepal", Sept. 1880, comm. *J. Scully*.

SIKKIM. Jongri, Chola Pass, 3900 m., Nov. 6, 1849, *J. D.*  
*Hooker* ; Jongri, 4000 m., Oct. 15, 1875, *C. B. Clarke* 25766,  
 26002 ; Dotha, 3600 m., 1912, *Rohmor Lepcha* 147.

TIBET. Chumbi ; Dotho above Gork, July 30, 1877, *Dungboo*  
 4676 ; Tu-chey, Kung, July 21, 1884, *Dr. King's collector* 16 ;  
 Sham Shen, July 1879, *Dungboo* ; near Phari, Aug. 16, 1878,  
*Dungboo* ; Tem-la, "1 day N.E. of Phari", July 31, 1882,  
*Dr. King's collector* (approaching var. *Farreri*) ; Yatung,  
 27°51' N., 88°35' E., *H. E. Hobson* 1897 ; Tsarong (S.E. Tibet),  
 open stony moorland on the Salwin-Kiuchiang divide N.W. of  
 Si-chi-to, Lat. 28°48' N., Long. 98°15' E., 3900 m., Oct. 1892,

*G. Forrest* 22792; Tonglipohri, 4000 m., Aug. 1882, *Dr. King's collector*.

YUNNAN. On stony alpine meadows, Mekong-Salwin divide, Lat. 27°30' N., Long. 98°56' E., 4500 m., Sept. 1921, *G. Forrest* 20410.

var. *Farreri* *Marquand* var. nov.; a typo differt foliis parvis fere trifidis 5–10 mm. longis petiolatis sed interdum vix distincta.

The extreme form of this variety, which is known in horticulture as *Cyananthus Farreri*, a hitherto unpublished name, is very distinct in vegetative characters, but a complete chain of intermediates exists and the later-formed leaves, towards the end of the branches of plants of the variety, are usually 5-fid and much more closely resemble the type, therefore I have no hesitation in according this plant merely varietal rank.

WESTERN CHINA (exact locality unknown). *Farrer*.

## 2. *Cyananthus fasciculatus* *Marquand* sp. nov.

Perennis? *Caudex* gracilis vix lignosus. Caules elongati, ad 70 cm., glabri vel parce pilosi. *Ramuli* divaricati elongati, glabri, foliis paucis et 3–5 floribus in apices. *Folia* alterna, petiolata, cordata, integra, fere glabra, 10–15 mm. longa, 8–12 mm. lata, tenuia. *Flores* parvi, breve pedunculati, inflorescentiis parvis dispositi. *Calyx* parce pilosus, ad medium divisus; dentes angustissime lanceolati, 6–8 mm. longi. *Corolla* pallida, basi intense coerulea, 2–2½ quam calyx longior; lobi breves obtusi.

YUNNAN. Amongst scrub and heavy herbage on the margins of alpine thickets, on the N.W. flank of the Lichiang Range, Lat. 27°20' N., Long. 100° 10' E., 3600 m., Oct. 1922, *G. Forrest* 22485.

## 3. *C. lichiangensis* *W. W. Smith* in Notes R. Bot. Gard. Edin. viii. 109 (1913).

YUNNAN. Moist situations among *Rhododendron* scrub, on the western flank of the Lichiang Range, Lat. 27°25' N., 3600 m., Aug. 1910, *G. Forrest* 6369.

## 4. *Cyananthus flavus* *Marquand* sp. nov.

Perennis. *Caudex* potius gracilis, vix lignosus, apice hypophyllis rosulatis pallidis subscariosis integris 2–3.5 mm. longis imbricatis dense obtectus. *Caules* pauci, adscendentes, simplices, fere glabri, 7–12 cm. longi, parte inferne nudi, superne folias alternas potius densas gignentes. *Folia* a basi ad apicem ramuli gradatim majora, elliptico-lanceolata, integra, 10–14 mm. longa, 6–7 mm. lata, utrinque parce pilosa et concoloria. *Petioli* brevissimi. *Flores* terminales, solitarii, pedunculati; pedunculus 15–20 mm. longus, glaber vel parce pilosus. *Calyx* glaber, vix inflatus; tubus 8–10 mm. longus; dentes triangulares, sub-obtusi, 3–3.5 mm. longi, intus apice parce albido-hispidi.



*Corolla pallido-flava*, 2-2½ quam calyx major ad medium lobata; lobi intus dense flavo-pilosi, triplo longiores quam lati.

YUNNAN. Open mountain pasture-land on the eastern flank of the Lichiang Range, Lat. 27°20' N., 3300-3600 m., July 1906, *G. Forrest* 2530 (type specimen); open limy pasture, eastern flank of the Lichiang Range, Lat. 27°30' N., 3300-3600 m., July 1910, *G. Forrest* 6102; in alpine meadows on the Chung-tien Plateau, 3500 m., Aug. 1914, *C. Schneider* 3570; Grassy slopes on the eastern side of the snow-covered mountain near Lichiang, c. 3500 m., 19 July 1914, *C. Schneider* 3644.

Incorrectly identified with *Cyananthus macrocalyx* Franchet by Diels in "Plantae Chinenses Forrestianae" (Notes R. Bot. Gard. Edin. vii. 139), from which it differs in the form of the leaves and peduncled flowers. Allied to *C. dolichosceles* (described below), from which it can be distinguished easily by the colour of the flowers and entire leaves.

5. **C. Hookeri** *C. B. Clarke* in Hooker Fl. Brit. Ind. iii. 435; Franchet in Morot Journ. de Bot. i. 281.

The four varieties following are distinct enough in extreme examples, but transitional stages occur.

var. **hispidus** Franchet in Morot Journ. de Bot. i. 281 (the type of the species).

NEPAL. "Eastern Nepal", 3600 m., *J. D. Hooker*.

SIKKIM. Dotha, "East Himalaya", 3600 m., 1912, *Rohmor Lepcha* 143.

TIBET. Tongola, Kiala, 1893, *J. A. Soulié* 672: Yatung 27°51' N., 88°35' E., 1897, *H. E. Hobson*: Phemba-La, 10-15 miles north of Lhasa, Sept. 1904, *H. J. Walton*: Kupchee, Chumbi, between Sikkim and Bhutan, 4 Aug. 1884, *Dr. King's collector*.

YUNNAN. 5 Sept. 1887, *Delavay*, Com. Herb. Mus. Paris: Stony Alpine pastures, 3600-3900 m., western flank of the Lichiang Range, Lat. 27°30' N., Aug. 1910, *G. Forrest* 6477: dry stony alpine pasture, 3900 m., eastern flank of the Lichiang Range, Lat. 27° 30' N., Sept. 1910, *G. Forrest* 6648: stony open pasture (flowers deep bluish purple), 4200 m., Bei-ma-shan-Mekong-Yangtze divide, Lat. 28°20' N., Aug. 1914, *G. Forrest* 13223: dry grasslands on the eastern side of the snow-capped mountains near Lichiang, c. 3100 m., 4 Sept. 1914, *C. Schneider* 3137: in dry fields at the foot of the snow-clad mountain near Lichiang, c. 2900 m., 11 Sept. 1914, *C. Schneider* 3114: dry fields near Lichiang, 2900 m., Oct. 1914, *C. Schneider* 3304.

SZE-CHUAN. Rocky grasslands at 3600 m., Sept. 1904, *E. H. Wilson* 4328.

var. **levicaulis** Franchet in Morot Journ. de Bot. i. 281.

TIBET. Sarong: Open stony pasture on Daker-la, Mekong-Salwin divide, 3900 m., Lat. 28°20' N., Aug. 1917, *G. Forrest* 14674.



YUNNAN. Grasslands near the summit of the mountain of Hee-chan-men, above Lankong, 3000 m., 7 Aug. 1884, *Delavay* 148, and on the same mountain 7 Oct. 1884 (without field No.), *Com. Herb. Mus. Paris*.

var. **densus** *Marquand* var. nov.; a typo differt ramulis confertis, foliis majoribus, calyce pilis pallidis densis vestito, floribus parum majoribus, ramulis pubescentibus quam var. *hispidus* multis longioribus.

TIBET. Sarong; on open stony pasture on Daker-la, Mekong-Salwin divide, 3900 m., Lat. 28°20' N., Aug. 1917, *G. Forrest* 14847.

SZE-CHUAN. Near Tachien-lu, between 2700 m. and 4000 m., *A. E. Pratt* 454 (varietal type).

var. **grandiflorus** *Marquand* var. nov.; a typo differt floribus multo majoribus, corolla ad 15 mm. longa, 4–6 mm. lata, ramulis glabris.

YUNNAN. Forming mats on stony dry meadows on the N.W. flank of the Lichiang Range, 3200 m., Lat. 27°20' N., Long. 100°10' E., Oct. 1922, *G. Forrest* 22477 (varietal type): open stony pasture on the Mekong-Salwin divide, Lat. 28°10' N., 3600 m., Sept. 1914, *G. Forrest* 13373, 14674.

6. **C. inflatus** *Hook. f. et Thoms.* in Journ. Linn. Soc. ii. 21; Hooker Fl. Brit. Ind. iii. 435. Franchet in Morot Journ. de Bot. i. 281.

var. **tenuis** *Franchet* in Morot Journ. de Bot. i. 281 (type of the species).

SIKKIM. General from 3600–3900 m., *J. D. Hooker*: Jongri, 3900 m., 15 Oct. 1875, *C. B. Clarke* 25851: Nambrangthang, 4200 m., 25 Nov. 1911, *Ribu & Rhomoo* 5860.

BHUTAN. *Herb. Griffith* 3434.

ASSAM. Jakpho, 3000 m., Naga Hills, 25 Oct. 1885, *C. B. Clarke* 41322.

YUNNAN. In cultivated fields on the mountain of Hee-chan-men, 2700 m., 7 Oct. 1884, *Delavay*: dry limestone alpine grasslands near Tengyueh opposite Tali, 2300 m., 29 Sept. 1914, *C. Schneider* 2693: in fields at the foot of the snow-covered mountains near Lichiang, c. 2900 m., 10 Sept. 1914, *C. Schneider* 3133: on a limy mountain pasture on the eastern flank of the Lichiang Range, 3600 m., Sept. 1910, *G. Forrest* 6695.

var. **rufus** *Franchet* in Morot Journ. de Bot. i. 281.

SIKKIM. 3600–4500 m., 24 Sept. 1849, *J. D. Hooker*: Jongri, 3600 m., 15 Oct. 1875, *C. B. Clarke* 25992.

TIBET. Kungboo, Chumbi, 7 Aug. 1884, *Dr. King's collector* 47.

BHUTAN. *Griffith* 1771.

YUNNAN. In cultivated fields on the slopes of the mountain of Hee-chan-men, above Lankong, 2700 m., 7 Oct. 1884, *Delavay* 146: Yunnan-fu, *Ducloux* 581.

SZE-CHUAN. Western part of the province, Oct. 1908, *E. H. Wilson* 1167.

var. **sylvestris** *Marquand* var. nov.; a typo et varietatibus

precedentibus differt foliis tenuibus majoribus ad 20 mm. longis 12 mm. latis subrhomboideis longe petiolatis, ramulis glabris, corolla pallida.

YUNNAN. Dry open situations in shady pine forests on the mountains in the N.E. of the Yangtze bend, Lat.  $27^{\circ}45'$  N., 3200 m., Sept. 1913, *G. Forrest* 11343.

7. **C. Forrestii** *Diels* in Notes Roy. Bot. Gard. Edin. v. 173 (1912).

YUNNAN. Open grassy situations on lava beds in the Ming Kwang valley, north of Ma chang, Lat.  $25^{\circ}15'$  N., 2000–2300 m., Oct. 1903, *G. Forrest* 955.

8. **C. Mairei** *Levl.* in Cat. des Pl. du Yun-nan, 25 (1915).

YUNNAN. Rocks of Io-chan, 3000 m., Aug. 1911, *E. Maire*.

From the description this would appear to be a distinct species, but the author has not seen the "type" specimen nor anything which can be referred to it.

9. **C. formosus** *Diels* in Notes Roy. Bot. Gard. Edin. v. 172 (1912).

YUNNAN. Open situations on limestone drift on the eastern flank of the Lichiang Range, Lat.  $27^{\circ}20'$  N., 3200–3600 m., Aug. 1906, *G. Forrest* 2726 (type specimen): on limestone drift and in crevices of limestone cliffs on the eastern flank of the Lichiang Range, Lat.  $27^{\circ}35'$  N., 3200–3900 m., July 1910, *G. Forrest* 6245: Sept. 1913, *G. Forrest* 11334: on limestone scree on the Kane Pass, Mekong-Yangtze divide, Lat.  $27^{\circ}40'$  N., 3600–3900 m., Aug. 1914, *G. Forrest* 13013: open stony pasture, 3900 m., on the Mekong-Salwin divide, Lat.  $28^{\circ}10'$  N., Sept. 1914, *G. Forrest* 13323: in meadows on the eastern side of the snow-covered mountains near Lichiang, 3600–3900 m., 30 July 1914, *C. Schneider* 2066: rocky places below the small glacier near Lichiang, c. 4000 m., 17 Aug. 1914, *C. Schneider* 3473.

10. **C. Delavayi** *Franchet* in Morot Journ. de Bot. i. 280. *C. barbatus* *Franchet* in Bull. Soc. Bot. de France xxxii. 9 (non Edgew.).

YUNNAN. In pastures on the mountain of Hee-chan-men, above Lankong, 3000–3500 m., flowers 16 Aug., fruit 9 Oct. 1884, *Delavay* 96 ter, 137: Yunnanfu, *Ducoux* 794, 2289: grasslands on the mountains between Tungyueh and Tengchuan, 3500 m., 29 Sept. 1914, *C. Schneider* 2692: west side of summit of mountain, Yunnan-sen, Oct. 1920, *J. Cavalerie* 7426: Yunnan-sen district, *E. E. Maire* 2342.

11. **Cyananthus dolichosceles** *Marquand* sp. nov.

Perennis. Caudex lignosus sed non crassus apice hypophyllis paucis subscariosis integris obtectus. Caulis 2–8 simplices supini vel adscendentes, 7–14 cm. longi, parce pubescentes. Folia alterna, in ramulis longioribus sparsa, in ramulis breviori-



bus confertiora, lanceolata vel obovata margine reflexa crenata, subsessilia, 9–12 mm. longa, 3–4 mm. lata, utrinque parce albido-pilosa. Flores terminales, solitarii; pedunculus 1–4 cm. longus, puberulus. Calyx subcylindricus, basi vix inflatus fere glaber; dentes triangulares circiter dimido quam tubus breviores, 10–14 mm. longi, 6–11 mm. lati, interne pallido-pilosi. Corolla intense coerulea, bis vel ter quam calyx longior; lobi anguste oblongi, intus dense pallido-pilosi.

Allied to *C. pedunculatus* but differing in the absence of the dense shaggy fuscous hairs on the outside of the calyx, the shorter peduncle and smaller flowers with narrower and deeper corolla lobes.

SZE-CHUAN. Grasslands, 2700–3200 m., July 1903, *E. H. Wilson* 3983 (type specimen): near Tachienlu, between 2700 and 4000 m., *A. E. Pratt* 572.

TIBET. Tongola, Kiala, 1893, *J. A. Soulié* 245.

12. *C. pedunculatus* Clarke in Hook. Fl. Brit. Ind. iii. 434; Franchet in Morot Journ. de Bot. i. 260. *C. linifolius* Hook. f. et Thoms. in Journ. Linn. Soc. ii. 20 *pro parte*.

SIKKIM. Tunga, 3600–3900 m., 25 July 1849, *J. D. Hooker*; Kongua Lama, 4200 m., 24 July 1849, *J. D. Hooker*; Lachong, 3600 m., 5 Sept. 1849, *J. D. Hooker*; Sandong, 4200–5000 m., 24 Sept. 1849, *J. D. Hooker*; Yorkla, 5000 m., 18 Oct. 1869, *C. B. Clarke* 9891: "Alpine Sikkim, March 1877", Com. *Elwes*: Uanqura Pass, 4700 m., 8 Aug. 1909, *Smith & Cave* 2266: Sangla, 5000 m., 6 Sept. 1911, *Ribu & Rhomoo* 5342: Ghorada, 5000 m., 25 Nov. 1911, *Ribu & Rhomoo* 5639.

TIBET. Tung-ka-la, north of Ze-lep-la (without date), and 16 Aug. 1882, *Dungboo*: Ta-chay-king, 21 July 1884, *Dr. King's collector* 35: Kapoop, 28 July 1884, *Dr. King's collector* 136: Yatung, 27°51' N., 88°35' E., *H. E. Hobson*. Mount Everest Expedition, 3600–4700 m., Aug. 1921, *A. F. R. Wollaston* 173, 174.

13. *C. cordifolius* Duthie in Kew Bull. 1912, 37.

NEPAL. Nampa Gadh, 3200 m., 28 July 1886, *Duthie* 5730.

UNITED PROVINCES. Kutti Yangti Valley, 3900 m., 26 July 1886, *Duthie* 3114.

14. *C. macrocalyx* Franchet in Morot Journ. de Bot. i. 279.

var. *macrocalyx* (Franchet) *Marquand*.

YUNNAN. Grasslands in the alpine region of the mountain of Hee-chan-men, above Lankong, 3800 m., 31 July 1885, *Delavay*: on the mountain of Kona-la-po, near Ho-kin, 3600 m., 26 Aug. 1884, *Delavay* 96: grasslands on the eastern side of the snow-covered mountains, near Lichiang, 3400 m., Oct. 1914, *C. Schneider* 3171.

var. *pilosus* *Marquand* var. nov.; a typo differt tantum calyce toto piloso.

YUNNAN. Tsekon, *Monbeig*, Com. 1905 (type specimen): open alpine pasture and on boulders, Bei Ma Shan, Mekong-

Yangtze divide, 3900 m., Lat 28°20' N., Aug. 1914, *G. Forrest* 13279.

var. **flavo-purpureus** *Marquand* var. nov.; a typo foliis tenuioribus majoribus, calyce 2-4 mm. longiore et latiore differt. *Calyx* quam corolla vix dimidio brevior. *Corolla* supra calycem pallido-flava, in parte inferiore atro-purpurea.

TIBET. Open stony pasture on Ka-gur-pu, Mekong-Salwin divide, Lat. 28°30' N., 4300 m., Aug. 1917, *G. Forrest* 14517.

15. **C. incanus** *Hook. f. et Thoms.* in Journ. Linn. Soc. ii. 20; *Hooker* Fl. Brit. Ind. iii. 434; *Franchet* in Morot Journ. de Bot. i. 279.

var. **trichocalyx** *Franchet* in Morot Journ. de Bot. i. 279.

SIKKIM. Lachen, 3600 m., 15 July 1849, *J. D. Hooker*; Tungu, 3600-3900 m., 23 July 1849, *J. D. Hooker*; Lama Gongra, 4200 m., 24 July 1849, *J. D. Hooker*; Yeumtong, 3600 m., 2 Sept. 1849, *J. D. Hooker*; Samdong, 3600-4200 m., 24 Sept. 1849, *J. D. Hooker*; "Alpine Sikkim", *Elwes*.

TIBET. Lonok, July-Aug. 1882, *F. E. Younghusband* 194, 202. Mount Everest Expedition, 1921, 3900 m., *A. F. R. Wollaston* 171.

var. **leiocalyx** *Franchet* in Morot Journ. de Bot. i. 279.

SIKKIM. Doko-la Pass, 3 Aug. 1893, *Cummins*.

TIBET. Phari, 28 July 1877, *G. King* 4600; Chongra, one day N.W. from Chumbi, 7 July 1878, *Dungboo*; Sham Chen, July 1879, *Dungboo*; Tem-la, one day north of Phari, 31 July 1882, *Dungboo*; Teesta Valley above Tangu, 3900 m., 12 July 1903, *F. E. Younghusband*; Kyi chu Valley, 15 miles east of Lhasa, Sept. 1904, *H. J. Walton*; Chumolari, 5000 m., 1912, *Rohnoo Lepcha* 512; Chumbi, 27 July 1884, *Dr. King's collector* 15.

YUNNAN. Grasslands on the mountain of Tsang-chan, above Tali, 3700 m., 4 Aug. 1884, *Delavay* 96 bis; moist stony mountain pasture on the eastern flank of the Tali Range, Lat. 25°40' N., 2700-3200 m., July 1906, *G. Forrest* 3847, 3848; open stony pasture on the Tali Range, Lat. 25°40' N., 3000 m., Aug. 1913, *G. Forrest* 11698.

SZE-CHUAN. Near Ta-chien-lu, between 2700 m. and 3900 m., *A. E. Pratt* 564; grasslands, 3000-3600 m., July 1903, *E. H. Wilson* 3982.

var. **parvus** *Marquand* var. nov.; a typo differt caule breve procumbente foliis densis tantum ad 3 mm. latis, calyce bis vel ter longiore quam lato.

TIBET. Yatung, 27°51' N., 88°35' E., 1897, *H. E. Hobson* (varietal type); "Central Tibet", Aug. 1892, *W. W. Rockhill*; Chongra, one day N.W. of Chumbi, 7 July 1878, *Dungboo*.

16. **C. integer** *Benth.* apud Royle Ill. Himal. Bot. 309, t. 69, fig. 2; Wall. Cat. 1472; *Hook. f. & Thoms.* in Journ. Linn. Soc. ii. 19; *Hooker* Fl. Brit. Ind. iii. 434; *Franchet* in Morot Journ. de Bot. i. 259. *C. barbatus* *Edgew.* in Trans. Linn. Soc. xx. 82.



UNITED PROVINCES. Kumaon, Wallich 1472; Rûr Pass, 3300 m., *R. Strachey & J. E. Winterbottom* 3. Garhwal: *Falconer* 617; Tunguath, 1844, *M. P. Edgeworth*; Hill above Saki in Ganges valley, Tehri, 3200–3600 m., 24 Aug. 1883, *J. F. Duthie* 607.

Vicary's specimen from Sirmore referred here in the Fl. Brit. Ind. is *C. microphyllus* Edge.

17. ***C. microphyllus*** *Edgeworth* in Trans. Linn. Soc. xx. 81. *C. linifolius* Wall. Cat. 3722; Hook. f. & Thoms. in Journ. Linn. Soc. ii. 20; Hooker Fl. Brit. Ind. iii. 434; Franchet in Morot Journ. de Bot. i. 260.

UNITED PROVINCES. Kumaon: Above Nana, 1844, *M. P. Edgeworth*; Ralam River, 3200 m., *R. Strachey & J. E. Winterbottom* 2. Sirmore: *Vicary*. Garhwal: *Falconer*; Haniza Karak, 4000 m., *R. Strachey & J. E. Winterbottom*.

KASHMIR. Dad Valley, *J. F. Duthie*.

It has been found necessary to re-establish the name *microphyllus*, for *Edgeworth's* description of this species was the first one published. The name *linifolius* was not accompanied by a description in the Wallich Catalogue.

18. ***C. petiolatus*** *Franchet* in Bull. Soc. Phil. Paris, Ser. 8, iii. 147.

SZE-CHUAN. Near Ta-tsien-lu, *Soulié*.

The writer has not seen the "type" of this species, but a specimen collected by Pratt in the same district and now in Herb. Kew. agrees very closely with the original diagnosis.

19. ***Cyananthus argenteus*** *Marquand* sp. nov.

Perennis. *Caudex* lignosus plus minusve crassus apice rosulis hypophyllorum subscariosorum integrorum obtectus. *Caules* multi, supini vix adscendentes, crassi, 15–25 cm. longi, fusci, pallido-pubescentes. *Ramuli* erecti, brevississimi, graciles, dense pubescentes. *Folia* conferta, alterna, anguste lanceolata, breve petiolata, ad 10 mm. longa, margine reflexa, superne subglabra, inferne lanata. *Flores* terminales, brevissime pedunculati. *Calyx* 15–18 mm. longus, 8–11 mm. latus, cylindricus, albido-pilosus; dentes anguste triangulares, 7–10 mm. longi. *Corolla* pulcherrima, rufescenti-purpurea, 40–50 mm. longa; tubus 7–9 mm. latus; lobi anguste-oblongi, apice subapiculati.

The flowers are deep bluish purple assuming a beautiful reddish purple shade when dry. It is a distinct species, allied to *C. longiflorus* and *C. microphyllus*, but differing from the former in the longer and narrower leaves, much less densely hairy calyx, and longer and narrower flowers which are pseudo-racemose instead of most frequently solitary and terminal, and from the latter in the hairy stem with densely placed leaves and pale sparse pubescence as compared with the dense thick black hairs of the Himalayan species.

YUNNAN. Grasslands on the mountain of Tsang, near Tali, 3600 m., 16 Oct. 1914, *C. Schneider* 2774; dry stony pasture

in open pine forests on the Lichiang Range, 3000–3200 m., Lat. 27°30' N., Sept. 1913, *G. Forrest* 11399; rocky grasslands at the foot of the snow-covered mountains near Lichiang, 2900 m., *C. Schneider* 3789.

20. *Cyananthus obtusilobus* Marquand sp. nov.

Perennis. Caudex non visus. Caules simplices supini vel adscendentes, 15–20 cm. longi, parce pubescentes, saepius



Fig. 1–2, leaves of *Cyananthus lobatus*  $\times 2$ . 3, *C. lobatus* var. *Farreri*  $\times 2$ . 4, *C. formosus*  $\times 5$ . 5, fruit of *C. inflatus*  $\times 1\frac{3}{4}$ . 6, *C. fasciculatus*  $\times 2\frac{1}{2}$ . 7, leaf of *C. Hookeri*  $\times 3$ . 8, leaf of *C. incanus*  $\times 2\frac{1}{2}$ . 9, leaf of *C. cordifolius*  $\times 1\frac{3}{4}$ . 10, *C. argenteus*  $\times 1\frac{3}{4}$ . 11, *C. obtusilobus*  $\times 1\frac{3}{4}$ . 12, *C. flavus*  $\times 1\frac{3}{4}$ .—Drawn from herbarium specimens, and corollas shown as they appear on the sheet.



unilaterales. *Folia* alterna in ramulis brevioribus conferta, in ramulis longioribus sparsa, subdeltoidea, crenulata, petiolata ad 12 mm. longa, margine reflexa, superne subglabra, subtus lanata. *Flores* simplices, terminales, subsessiles. *Calyx* subcylindricus, 12–14 mm. longus, 10–12 mm. latus, extus parce pilosus, margine dentorum dense pilosus; dentes satis late triangulares, ad 6 mm. longi, subobtusius. *Corolla* purpurea, 40–50 mm. longa; tubus 9–11 mm. latus; lobi late-oblongi, apice subobtusius.

Closely allied to *C. longiflorus*, but distinct in the much smaller calyx with obtuse lobes and shallow sinus, and not becoming sub-globose after flowering, also in the hairs on the calyx being sparse as in *C. argenteus*.

YUNNAN. In grasslands on the mountain of Tsang near Tali, 2800 m., 16 Oct. 1914, *C. Schneider* 2753.

21. ***C. longiflorus*** *Franchet* in *Morot Journ. de Bot.* i. 280.

YUNNAN. Grasslands in the uppermost regions of the mountain of Hee-chan-men above Lankong, 4 Sept. 1884, *Delavay* 96 quat.; on the mountain of Tsang-chan, above Ta-li, *Delavay* 138; shady rocky situations on the eastern flank of the Tali Range, Lat. 25°40' N., 2700–3200 m., Sept.–Oct. 1906, *G. Forrest* 3849; rocky alpine grasslands near Tali-fu, 3500 m., Aug. 1914, *C. Schneider* 2514; limy alpine pastures between Shiku and Chungtien, 3400 m., Aug. 1914, *C. Schneider* 2380; dry stony pasture north end of valley in Lat. 27°20' N., 2700 m., Sept. 1910, *G. Forrest* 6516; on open alpine meadows on the N.W. flank of the Lichiang Range, Lat. 27°20' N., Long. 100°10' E., 4200 m., Oct. 1922, *G. Forrest* 22474.

## XXVIII.—DIAGNOSES AFRICANAE: LXXVIII.

1691. ***Pyrenacantha ugandensis*** *Hutchinson et Robyns* [Icacinaceae]; affinis *Pyrenacantha Staudtii* Hutch. et Robyns (comb. nov.) (*Chlamydocarya Staudtii* Engl.), sed foliis conspicue repando-dentatis differt.

*Frutex* probabiliter scandens, ramis longitudinaliter canaliculatis superne ferrugineo-tomentellis. *Folia* oblongo-elliptica, apice abrupte acute acuminata, basi rotundata vel subcordata, 12–17 cm. longa, 5–9 cm. lata, dupliciter repando-dentata, rigide chartacea, discoloria, supra nervis exceptis glabra, viridia, minute reticulata, infra pallidiora, pilis brevibus rigidis dense induta, nervis lateralibus circiter 4 ascendentibus subtus valde prominentibus utrinque ferrugineo-tomentellis; petioli saepe contorti et interdum arcuati, usque ad 3 cm. longi, tomentelli.

*Flores* ♀ tantum visi; spicae axillares, solitariae, petiolis vix aequilongae, breviter pedunculatae, densiflorae; bracteae floribus breviores, crassae, spathulato-obovatae, breviter villosae. *Sepala* 4, persistentia, oblongo-elliptica, obtusa, 3.5 mm. longa,

1 mm. lata, extra appresse sericea, intra glabra. *Petala* (staminodia ?) cum sepalis alternantia, subulata, minuta, subcarnosa. *Ovarium* villosum, 1-loculare, biovulatum; styli 5, radiati, appressi, 2-3-lobati. *Fructus* immaturus breviter stipitatus, ellipsoideus, tomentosus, endocarpio conspicue intruso.

TROPICAL AFRICA. Uganda: Entebbe district, 1200 m. on the edge of the forest, *Maitland* 459 (type), 583.

*Chlamydocarya Staudtii* was described by Engler (Bot. Jahrb. 24: 486, t. 8, fig. A-D) from a male specimen collected by Staudt (No. 568) in the Cameroons. We have now discovered a fruiting specimen collected at Ahara, in Southern Nigeria, by H. N. Thompson (No. 511), which matches exactly with Engler's type specimen. This material proves this species to be a *Pyrenacantha*, and not a *Chlamydocarya*, on account of the structure of the fruit.

1692. *Mniothamnea passerinoides* C. H. Wright [Bruniaceae]; species a *M. callunoides* Nied. facie laxiore foliisque glabris distinguitur.

*Frutex* ericoideus, ramis juvenilibus exceptis glaber. *Rami* tenues, cylindrici, primum albolanosi, mox glabri. *Folia* ad ramos appressa, oblonga, 2.5 mm. longa, acuta, trigona. *Flores* in axillis foliorum summorum pauci fasciculatim dispositi. *Calycis* tubus obconicus, 1 mm. longus; lobi tubo aequilongi, oblongi, 1-nervi. *Petala* ovalia, obtusa, 1.5 mm. longa. *Stamina* quam sepala breviora; filamenta subulata; antherae breviter ovals. *Ovarium* obconicum. *Semen* solitarium, brunneum.

SOUTH AFRICA. Without precise locality (probably Somerset West), *T. P. Stokoe*.

This species greatly resembles some *Thymelaeaceae*. From *M. callunoides* Nied. (*Berzelia callunoides* Oliv. in Hook. Ic. Plant. t. 1014) it is at once distinguished by its much more lax habit and by being glabrous except at the tips of the young branches.

1693. *Oldenlandia setulosa* F. C. Wilson [Rubiaceae]; affinis *O. thymelifoliae* Presl, sed ubique setulosa, pedicellis et corollarum tubis brevioribus differt.

*Planta* suffruticosa, ubique setulosa; rami erecti, subteretes, circiter 1.5 mm. diametro. *Folia* linearia vel spathulata, acuta, usque ad 4.5 cm. longa et 0.7 cm. lata, supra glabra, subtus costa media puberula excepta glabra, marginibus revolutis setulosis; stipulae basi vaginatae, membranaceae, apice setosae, setis subulatis circiter 1.5 mm. longis. *Paniculae* laxae ramosae; rami erecto-patentes, graciles, scabridi. *Flores* sessiles vel subsessiles. *Receptaculum* subglobosum, setuloso-pubescens, 1-2.5 mm. longum. *Calycis* lobi subulati, 1 mm. longi. *Corollae* tubus circiter 3 mm. longus, angustissimus, superne ampliatus, extra glaber, lobis 2 mm. longis dorso medio minute setulosis. *Capsula* leviter didyma, depresso-globosa, papillato-setulosa, 4-5 mm. diametro, calycis lobis persistentibus coronata.

SOUTH AFRICA. Transvaal: Waterberg District; Mosdene-Naboomspruit, Dec. 1920, *E. E. Galpin* 487 m.

1694. *Tricalysia lineariloba* *Hutchinson* [Rubiaceae]; affinis *T. Welwitschii* K. Schum., sed floribus multo majoribus, calycis lobis filiformibus, antheris pilosis differt.

*Ramuli* ultimi elongati, subdense foliati, piloso-pubescentes, internodiis circiter 4 cm. longis. *Folia* oblongo-elliptica, basi rotundata, apice breviter et sensim acuminata, subacuta, 9-14 cm. longa, 3-5 cm. lata, margine recurvata, chartacea, supra parce setulosa, infra in costis et nervis pubescentia, inter nervos puberula; nervi laterales utrinsecus 8-9, supra leviter impressi, subtus prominentes intra marginem distincte conjuncti; petioli brevissimi, dense setoso-pilosi; stipulae filiformes, 7-8 mm. longae, pubescentes. *Flores* axillares, pauci, in ramulis brevissimis sessiles; bracteolae subulato-filiformes, 5 mm. longae. *Receptaculum* dense hispido-tomentosum. *Calycis* *tubus* cylindricus, 4 mm. longus, extra parce pubescens; lobi 6, filiformes, corollae tubo aequales, pubescentes. *Corollae* *tubus* 1-1.2 cm. longus, extra fere glaber, intra superne pubescens; lobi 6, oblongo-lineares, acutissime acuminati, circiter 1.4 cm. longi et 2.5 mm. lati, extra minute puberuli. *Stamina* exserta; filamenta 5 mm. longa, glabra; antherae 7 mm. longae, pilosae. *Stylus* 2 cm. longus, superne tenuiter pilosus, stigmatibus carnosus 3 mm. longis supra glabris dorso parce pilosis. *Fructus* non visus.

TROPICAL AFRICA. Cameroons: Bitye, near the River Ja, *G. L. Bates* 1747.

1695. *Arctotis Roodae* *Hutchinson* [Compositae]; affinis *A. Gumbletonii* Hk. f., sed foliorum lobis remotis apice triangulari-subacutis, floribus radiis rubris differt.

*Herba* usque ad 20 cm. alta, subacaulis, ubique tenuiter arachnoideo-pubescent. *Folia* patula, pinnatipartita, ambitu oblanceolato-spathulata, usque ad 20 cm. longa et 5 cm. lata, lobis utrinsecus circiter 3 oblongis denticulatis, lobo terminale oblongo-obovato crasse dentato conspicue trinervo; petioli ad 7 cm. longi, supra plani, 3.5 mm. lati, infra rotundati. *Pedunculus* simplex, basin versus 1-2-foliatus, usque ad 15 cm. longus, medio circiter 4 mm. crassus, sulcatus, arachnoideus. *Capitula* magna, circiter 7.5 cm. expansa, alabastro nutantia, demum horizontalia. *Involucri* *bracteae* circiter 4-seriatae, series 2 exteriores lineari-lanceolatae, foliaceae, arachnoideae, series 2 interiores late oblongae superne membranaceae, rotundatae, glabrae. *Flores* *radii* circiter 25, supra rubri, basin versus atropurpurei, infra pallidiores, apice minute tridentati. *Flores* *disci* alabastro nigri, demum aurantiaci. *Achaenia* villosa, pappo magno membranaceo coronata.

SOUTH AFRICA. Described from a cultivated specimen grown from seed sent to Mr. N. E. Brown from near Vanrhynsdorp by Mrs. Rood. The flower-head is very handsome, and



this species should prove a useful acquisition for greenhouse culture. The nearest affinity appears to be with *A. Gumbletonii* Hk. f.

1696. *Venidium intermedium* Hutchinson et Robyns [Compositae]; species pedunculis apicem versus conspicue contractis dense setosis valde distincta.

*Herbacea* erecta, usque ad 4 dm. alta, superne parce ramosa; caulis circiter 1 cm. crassus, conspicue longitudinaliter viridilineatus, tenuiter lanatus. *Folia* conspersa, longe petiolata, lyrata, utrinque circiter 4-lobata, 12-20 cm. longa, 4-8 cm. lata, chartacea, utrinque tenuiter albo-lanata; lobi oblongo-lanceolati, obtusi, usque ad 4 cm. longi et 1.5 cm. lati, minutissime et remote denticulati; petioli lamina breviores, supra late concavi. *Pedunculi* terminales, basin versus robusti, usque ad 22 cm. longi, apicem versus dense setosi, ubique tenuiter lanati. *Capitulum* alabastro primum erectum, deinde nutans, demumque subanthesin erectum, circiter 7 cm. expansum. *Involucrum* hemisphaericum, 1 cm. altum, basi contractum, nitens et glabrum; bractee circiter 5-seriatae, exteriores basi concretae, ovatae, appendiculatae, appendiculo oblongo-lanceolato 2.5 mm. longo ciliato, interiores oblongo-ovatae, obtusae, inappendiculatae, glabrae, marginibus angustissime hyalinae. *Flores radii* circiter 20, supra albi, basi et apice flavescentes, dorso 4-nervi, nervis erubescens; tubus 3 mm. longus, glaber; lamina oblanceolata, apice tridentata, 3 cm. longa, 0.8 cm. lata; stylus rudimentarius. *Flores disci* aurantiaci; corollae tubus inferne abrupte contractus, superne campanulatus, lobis nigrescentibus. *Antherae* nigro-purpureae. *Stylus* crassus, exsertus. *Ovarium* basi pilis longis albis cinctum papillosum. *Pappi squamae* 3, parvae, membranaceae, vix 0.25 mm. longae.

SOUTH AFRICA. Described from a plant grown in the Royal Botanic Gardens, Kew, from seed obtained through Mr. N. E. Brown from South Africa. The name *V. intermedium* is applied because this species apparently comes almost intermediate between the genera *Arctotis* and *Venidium*, having the large tuft of hairs at the base of the achenes characteristic of *Arctotis*, but with the reduced pappus of the genus *Venidium*. A peculiar feature of the species is the sharply contracted apex of the peduncle, which is there densely setose, whilst the base of the involucre is quite glabrous and shining.

1697. *Asclepias nana* Verdoorn [Asclepiadaceae]; affinis *A. cucullatae* Schlechter, et *A. brevispidi* Schlechter, sed coronae lobis supra quadratis truncatis bidentatis differt.

*Herba* 8-10 mm. alta. *Caulis* compressus, albo-pubescent. *Folia* sessilia, 3-6 cm. longa, linearia, apice acuta, glabra. *Inflorescentia* umbellata, pedunculata, axillaris, 4-flora. *Pedunculus* 5-8 mm. longus, pubescens. *Pedicellus* 4-5 mm. longus, sparse pubescens. *Sepala* 3 mm. longa, 1 mm. lata, lanceolata, apice acuta, sparse pubescentia. *Petala* 6 mm. longa, 4 mm.

lata, ovata, ciliata. *Lobi coronae* quadrati, apice truncati, bidentati, basi angustati, intus exappendiculati. *Appendices* antherae suborbiculati, bilobati, breves.

SOUTH AFRICA. Waterberg Div.: Pyramid Estate near Potgieter's Rust, on granite plains, 1400 m., corona white, *Galpin* 8148, and in *National Herbarium* 2721.

Allied to *A. cucullata* Schlechter, and *A. brevicuspis* Schlechter, but differing from *A. cucullata*, which has a semi-circular corona dorsally notched or produced into a point and puberulous within with the anther appendages acute, and from *A. brevicuspis*, which has a linear-oblong corona with rounded inner apical angles and an acute dorsal angle, and the lobes having narrow wings on each side.

1698. *Brachystelma viridiflorum* Turrill [Asclepiadaceae]; affinis e descriptione *B. Schonlandiano* Schlechter, sed caulibus multo altioribus, foliis longioribus, inflorescentibus multifloris, corolla haud glabra differt.

*Tuber* oblongo-cylindricum, 5 cm. diametro. *Caules* usque ad 2.4 cm. alti, teretes, graciles, dense puberuli. *Folia* linearia vel lineari-oblancoolata, apice obtusa vel subacuta, basi in petiolum circiter 5 mm. longum angustata, 1.5-4 cm. longa, 3-5 mm. lata, ciliata, in pagina inferiore leviter puberula, superiore glabra vel fere glabra, supra costa impressa subtus prominente, nervis lateralibus inconspicuis. *Inflorescentiae* in foliorum superiorum axillis positae, usque ad 12-florae; pedunculus 5 mm. longus. *Calyx* quinquepartitus, segmentis oblongo-triangularibus acutis 1.5 mm. longis 1 mm. latis. *Corolla* viridis, tubo 2 mm. longo, lobis patulis oblongis 3 mm. longis 1-5 mm. latis extra puberulis intus glabris. *Filamenta* crassa, corollae tubo adnata, apice dorso in coronam trifidam prolonga, segmento medio subulato 1.5 mm. longo incurvo basi puberulo, segmentis lateralibus crassis 0.75 mm. longis viridibus apice leviter purpureis; antherae 1.25 mm. longae, acutae.

SOUTH AFRICA. Described from a living plant cultivated in the Royal Botanic Gardens, Kew, and received from Pretoria. In flower at Kew, June, 1923.

1699. *Phyllanthus cedrelifolia* Verdoorn [Euphorbiaceae]; affinis *P. verrucoso* Thunb. sed ramulis floriferis in ramis defoliatis fasciculatis, sepalis 5, staminibus 5 omnibus liberis differt.

*Arbor* parva 3.5-4.5 m. alta. *Cortex* verrucosa, caduca. *Folia* elliptica, 0.5-3 cm. longa, 0.4-2 cm. lata, apice saepissime 1.3 cm. lata, subacuta vel rotundata, basi rotundata vel subcuneata, glabra, chartacea, caduca; petiolus circiter 2 mm. longus; stipulae circiter 2 mm. longae, laciniatae, rubrae. *Ramuli* floriferi defoliati, 3-16 cm. longi, in ramis fasciculatis. *Flores* monoici, fasciculati, ♀ solitarii, ♂ numerosi. *Flores* ♀: pedicelli quam ♂ longiores et leviter robustiores, circiter 6 mm. longi. *Sepala* 5, 1.5-2 mm. longa, 1.5 mm. lata. *Discus* patelliformis, lobatus. *Ovarium* loculis 2-ovulatis; styli 3, bilobi, acuti; lobi curvati. *Flores* ♂: pedicelli 1.5 mm. longi.



*Brachystelma viridiflorum* Turrill. 1. Entire plant (x  $\frac{3}{4}$ ). 2. Leaf (x 2). 3. Flower seen from side (x  $3\frac{1}{2}$ ). 4. Flower seen from above (x  $3\frac{1}{2}$ ). 5. Flower seen from below (x  $3\frac{1}{2}$ ). 6. Flower with corolla lobes removed (x 4). 7. Corolla spread open showing corona and androecium (x 4).



*Sepala* 5, 1.75 mm. longa, 1 mm. lata, membranacea. *Stamina* 5, filamentis liberis. *Disci glandulae* 5.

SOUTH AFRICA. Lusikisiki Dist.; Egosa Forest Reserve, Fraser in *National Herb.* No. 2831, in *Herb. Forest Dept.* No. 5381 (type). Leaves up to 5 cm. long and 2.2 cm. broad.

*O. B. Miller* in *Herb. Forest. Dept.* No. 5028. Fruiting specimen. *Capsule* depresso-globose 2 mm. in diam. and 1.5 mm. high, smooth. *Leaves* up to 4.5 cm. long and 2.2 cm. broad.

*O. B. Miller* in *Herb. Forest. Dept.* No. 5170. Specimen consisting mostly of the defoliated flowering branches, flowers agreeing with the type. The few leaves present from 0.3–2 cm. long and 0.2–1 cm. broad.

*O. B. Miller* in *Herb. Forest. Dept.* No. 5374. Forester Fraser states "The identity of this tree is unknown to me and enquiries do not show that it has any native name. A small deciduous tree of branching habit with roughish bark. About 12–15 ft. high".

1700. *Drypetes Battiscombei* *Hutchinson* [Euphorbiaceae]; affinis *D. Principo* *Hutchinson*, sed foliis basi plerumque inaequilateralibus minoribus firme chartaceis, sepalis extra appresse pubescentibus, staminibus 4 differt.

*Ramuli* annotini obtuse angulati, parce setuloso-pubescentes. *Folia* oblonga vel elliptica, basi acuta interdum valde inaequalia, apice sensim subacute-acuminata, 5–10 cm. longa, 2–5 cm. lata, obscure denticulata vel subintegra, firme chartacea, utrinque conspicue reticulata, glabra; nervi laterales utrinsecus circiter 8, marginem versus multe ramosi; petioli 0.5–1 cm. longi, breviter pubescentes; stipulae caducae. *Flores* ♂ axillares, fasciculati; pedicelli 0.5 cm. longi, graciles, pubescentes; sepala obovata, 3 mm. longa, extra appresse pubescentia; stamina 4; discus glaber. *Flores* ♀ axillares, solitarii; pedicelli circiter 0.5 cm. longi, pubescentes; sepala florum masculorum eis similia; discus patelliformis, crassus, undulatus, glaber; ovarium 2-loculare, leviter 2-lobum, dense tomentosum. *Fructus* ambitu depresso-globosus, leviter bilobus, molliter tomentosus, circiter 1.5 cm. diametro, stylis 2 late divergentibus persistentibus coronatus.

TROPICAL AFRICA. Kenya Colony: Arboretum at Nairobi, ♂ and ♀ fls., *E. Battiscombe* 935 (type). Mnyenye, near Nairobi, 1800 m., in young fruit, *E. Battiscombe* 525; mature fruit, *C. F. Elliott* 281.

## XXIX.—DECADES KEWENSES

PLANTARUM NOVARUM IN HERBARIO HORTI REGII  
CONSERVATORUM.

### DECAS CIX.

1081. *Garcinia Holttumi* *Ridl.* [Guttiferae-Garcinieae]; affinis *G. rostratae* *Benth.* sed foliis multo angustioribus et valde coriaceis distinguitur.

*Arbor* 5 ad 6 m. alta, ramis gracilibus. *Folia* rigide coriacea, lanceolata, acuminata, cuspidata, basibus angustata, 5·6 cm. longa, 1·8 cm. lata; nervi omnino invisi. *Cymae* in axillis superioribus congestae, 1, 2 vel 3 in axilla, pedunculis brevibus, pedicellis 2 mm. longis crassiusculis. *Flores masculi* circiter 2 mm. lati; sepala 2, brevia, ovata; petala 5, orbicularia, imbricata; stamina in laminis 5 oblongis, antheris in utroque facie; pistillodium gracile; stigmata discoidea. *Flores feminei* et *fructus* haud visi.

MALAY PENINSULA. Johor: Gunong Belumut, at 3000 ft. alt., a fairly common tree, *Holtum* 1029.

This is allied to *G. rostrata* Benth. but has the leaves much narrower and thickly coriaceous.

1082. *Grewia latistipulata* Ridl. [Tiliaceae]; affinis *G. latifoliae* Mast. sed omnino glabra inflorescentia excepta, stipulisque persistentibus magnis coriaceis.

*Arbor* glabra, inflorescentia excepta. *Folia* coriacea, elliptica, obtusa, basibus late rotundata, 30 cm. longa 12·5 cm. lata; nervi subtus elevati 12 pares; petioli crassi, 10 mm. longi; stipulae persistentes, coriaceae, oblongo-obovatae, apicibus rotundatae, 1·4 cm. longae, 1 cm. latae. *Panicula* terminalis, 7·5 cm. longa, ramis brevibus 1·2 cm. longis, glomerulis 4 vel 5 involucrentis, stipula persistente ad basin. *Involucrum* subsessile, bracteis 8 oblongis obtusis utrinque tomentosis 6 mm. longis, floribus in involucre 4 breviter pedicellatis. Sepala 5, tomentosa, lineari-oblonga, 6 mm. longa. *Petala* perparva, anguste oblonga, mucronata, glabra. *Stamina* circiter 20, sepalis aequilonga, filamentis gracilibus. *Ovarium* conicum, hirtum, disco hirto.

MALAY PENINSULA. Selangor: Klang, *Burkill* 7826.

Var. *lanceolata* Ridl.; foliis lanceolatis angustioribus basi acuminatis stipulis minoribus, drupis pyriformibus obscure trilobis glabris distincta.

SUMATRA, *Herb. Hook.* Sungei Bulu, Padang, *Beccari* 931 and 937.

These specimens are all in young flower, except *Beccari* 937 which is in fruit. The leaves in all are exactly alike. I take them to be another form or state of the Selangor plant.

1083. *Microtropis peduncularis* Ridl. [Celastraceae]; *M. validae* Ridl. affinis floribus tetrameris, petalis oblongis floribus multo minoribus differt.

*Frutex* 1·5 ad 2 m. altus. *Folia* elliptica, cuspidata, acuminata, basibus cuneata, coriacea, 12·5 ad 18 cm. longa, 5 ad 6 cm. lata; nervi 6 pares obscuri; petioli crassi, canaliculati, 1·5 cm. longi. *Cymae* 3·7 cm. longae et aequilatae; pedunculi 3 cm. longi; rami angulati; bractae persistentes, ovato-lanceolatae, acutae, 1 mm. longa. *Flores* ceracei, flavi, 2 mm. lati. *Sepala* 4, imbricata, rotundata. *Petala* 4, libera, quam sepalis longiora, oblongo-ovata, marginibus involutis. *Stamina* 5, filamentis brevissimis crassis, antheris bilocularibus. *Stylus* columnari truncatus stamina superante.

MALAY PENINSULA. Perak : Ulu Bubong, in very dense jungle, at 400 to 600 ft. alt., *Kunstler*.

1084. *Swertia pedicellata* *Banerji* [Gentianaceae] ; affinis *S. purpurascens* Wall., sed stylo brevissimo distincta.

*Herba* erecta, parva, annua, ramosissima, in sicco nigrescens ; caulis infra subteres ; ramuli quadrangulares, infra 4 lineas marginales breviter obtuse tuberculatas exhibentes, supra anguste quadrialati ; internodia caulis circiter 1.9 cm. longa ; rami ascendentes. *Folia* opposita, anguste lanceolata, trinervia, subtus farinosa, fere sessilia, 1.3–1.9 cm. longa, 3–5 mm. lata ; folia caulis primarii usque ad 2.5 cm. longa. *Cymae* terminales et axillares, 3–5-florae. *Flores* parvi, caeruleascentes, pedicellati, pedicellis 8 mm. longis. *Calyx* plus minusve campanulatus, intus basi ciliatus, 4 mm. longus, 5-partitus ; lobi 3 mm. longi. *Corolla* paulo calyce maior, late campanulata in parte tertia inferiore pallide-purpurea ; lobi brevissime uniti circiter 4 mm. longi, intus basi uniglandulosi, glandula arcuata et squama oblecta. *Stamina* 5 ; filamenta linearia, basi brevissime connata et corollae tubo adnata ; antherae obtusae. *Ovarium* uniloculare. *Stylus* brevissimus ; stigmata 2. *Capsula* anguste ovoidea, 6 mm. longa, pedicellata. *Semina* pauca, globosa, puncticulata.—*S. purpurascens* Wall. var. *ramosa* Burkill in Journ. As. Soc. Beng. N.S. iii. 34.

N.E. INDIA. Bengal : Darjeeling Dist. ; Senchal, in open grassy places at 2700 m. alt., Oct. 1921, fl., *Banerji* 89, Mar. 1922, frt., *Banerji* 98.

1085. *Verbascum luteo-viride* *Turrill* (Scrophulariaceae-Verbasceae) ; Sect. *Lychnitis* Benth. in DC. Prod. x. 230 (1846) ; Subsect. *Thapsoidea* Benth. l.c., sensu mutato Boiss. Fl. Or. iv. 299 (1879) ; ab *V. pinnatifido* Vahl Symb. ii. 39 (1791) foliorum ambitu, inflorescentia haud ramosa valde differt.

*Planta* tota plus minusve albo-tomentosa, pilis umbellato-ramosis sessilibus vel saepissime stipitatis instructa. *Caulis* erectus, inferne teres glabrescens, superne leviter angulatus dense albo-tomentosus. *Folia* radicalia non vidi, caulina acute acuminata margine irregulariter crenata, in pagina inferiore dense albo-tomentosa, in pagina superiore minus albo-tomentosa fere viridia vel luteo-viridia, inferiora ovata, basi cordata, 6.5 cm. longa, 3 cm. lata, in superiora fere orbicularia amplexicaulia 2.3 cm. diametro transientia. *Flores* glomerati, sessiles, glomerulis in racemum 4 dm. longum laxè dispositis. *Bractae* inferiores foliis superioribus similes, superiores late ovatae, plus minusve acuminatae, circiter 1 cm. longae et 7 mm. latae, margine crenato-dentatae vel crenato-serratae, sessiles, luteo-virides, venosae. *Calyx* fere ad basin in sepala 5 subaequalia divisus, sepalis anguste oblongis vel lanceolato-oblongis obtusis vel subacutis minute apiculatis 4–6 mm. longis 2–3 mm. latis usque ad 2–3 mm. infra apicem dense albo-tomentosis apicem versus viridibus glabrisque. *Corolla* lutea, circiter 2 cm. diametro,



extra albo-tomentosa, intus glabra. *Stamina* filamentis inferne pilis albo-flavidis obtectis et antheris omnibus reniformibus instructa. *Ovarium* ovoideum, 2.5 mm. altum, 2 mm. diametro, dense albo-tomentosum; stylus 7.5 mm. longus, glaber, superne leviter clavatus. *Capsula* ignota.

NORTH-EAST BULGARIA: district Rouscuck, near Shtrklevo (Straklio vo), August 14th, 1892, S. *Géorgiev*.

That a great number of species of the genus *Verbascum* occur in the Balkan Peninsula is well known. Indeed, it is reasonable to conclude that here is one of the developmental centres of the genus. Approximately 80 species are known, on the basis of a moderate species standard, to occur in the Balkan Peninsula. Not only is the number of species large, but the genus as a whole is conspicuous in the vegetation of the summer months, especially in that found on the drier treeless hill-slopes. Many of these slopes should naturally be forested, but various factors have led to their deforestation often within the historical period. It may be suggested that certain genera, which, both in species and individuals, are so abundant in this kind of situation in the Balkan Peninsula, have been able to become a conspicuous feature of the vegetation and new species, however originating, have been able to establish themselves and often to spread as a direct result of the forest destruction for which the evidence is conclusive.

Macedonia and Bulgaria are particularly rich in endemic species of *Verbascum*. The new species here described from North-Eastern Bulgaria has been difficult to place systematically. The anthers are all reniform and the inflorescence has the flowers in glomerules which are arranged in a racemose manner on the long unbranched main rhachis. The bracts gradually lose many of their foliage-leaf characters when traced from the lower part of the inflorescence upwards and the typical bracts in the upper part of the inflorescence are so distinctly yellow-green as to suggest the trivial which has been used.

1086. *Plectranthus Bourneae* Gamble [Labiatae-Ocimoideae]; *P. fruticoso* Hook. f. affinis, foliis multo minoribus crassioribus, calyce fructifero minori differt.

*Frutex* erectus carnosus, ramulis crassis subangulatis albide villosis. *Folia* ovato-orbicularia, dense fulvo-tomentosa, apice obtusa, basi paullo cuneata, in parte superiore crenata vel dentata, inferiore integra, 2-4 cm. diametro; nervi utrinque 4-6, pilis glandulosis albidis ornati; petiolus crassus, 5-15 mm. longus; foliola minora ex axillis foliorum saepe inventa.

*Inflorescentia* terminalis thyrsoides, 12-25 cm. longa, e racemis multis biramosis 3-4 cm. longis composita; folia floralia ovata, acuta, perdecidua, ultimis solum aliquando reperiendis. *Calyx* parvus, villosus; fructifer auctus, ad 5 mm. longus, glanduloso-villosus; labium superius ovatum, acutum, paullo reflexum, inferius dentibus 4 subulatis aequilongis. *Corolla* lilacina, 15 mm. longa; tubus declinatus, infundibuliformis; labium superius

maxime reflexum, inferius productum, acutum, concavum, extus puberulum, marginibus ciliatis. *Stamina* 4, vix exserta. *Nuculae* ovoideae, laeves, nigrae vel brunneae, madidae mucilaginosae.

S. INDIA. Pulney Hills, in Madura District, at about 2000 m. alt. in ravines and under rocks, *Sir A. and Lady Bourne* 1308, 1308\*, 1331, 1338\*, 1367, 1393, 1503, 1553\*, 2028; Nilgiri Hills, near Coonoor, at 2000 m. alt., Aug., 1883, *J. S. Gamble* 12263.

1087. **Plectranthus Bishopianus** *Gamble* [Labiatae-Ocimoideae]; *P. Bourneae* *Gamble* affinis foliis majoribus tenuioribus subglabratis, racemis gracilibus, floribus distantibus et calyce fructifero multo minore differt.

*Frutex* erectus plus minusve carnosus, ramulis crassis glabratis vix angulatis. *Folia* ovata, minute puberula, subtus purpurascentia, apice subacuta, basi truncata vel paullo cuneata, in parte superiore crenata, basin versus integra, 4–8 cm. longa, 2–6 cm. lata; nervi utrinque 5–6 minute puberuli; petiolus paullo crassus, 2–4 cm. longus. *Inflorescentia* terminalis thyrsioidea, 12–24 cm. longa, e racemis multis biramosis gracilibus 6–8 cm. longis fulvo-puberulis composita, floribus parvis distantibus; folia floralia ovata, acuta, caducissima, ultimis solum aliquando reperiendis. *Calyx* minutus, vix 2 mm. longus, albo-villosus; fructifer auctus, ad 4 mm. longus, glanduloso-villosus; labium superius ovatum reflexum, inferius dentibus 4 subulatis aequilongis. *Corolla* lilacina, elongata, puberula, 1 cm. longa; tubus declinatus et curvatus; labium superius erectum, inferius porrectum concavum apice subobtusum, ciliatum. *Stamina* 4, paullo exserta. *Nuculae* ignotae sed verosimiliter minutae.

S. INDIA. Pulney Hills in Madura District, at about 2300 m. alt., in 'Shola' forest at Pillar rocks, in 1899 to 1901, *Sir A. and Lady Bourne* 1329, 1398. Drawing in Kew collection by Mrs. Bishop for Lady Bourne.

1088. **Anisochilus argenteus** *Gamble* [Labiatae-Ocimoideae]; *A. plantagineo* Hook. f. et *A. sericeo* Benth. affinis ab illa specie ramis et pedunculis elongatis, foliis mucronatis, ab hac spicis singulis nec paniculatis, foliis minoribus differt.

*Herba* perennis ramosa vel suffrutex, ramulis canaliculatis argenteo-sericeis, foliorum delapsorum cicatricibus conspicue notatis. *Folia* opposita, disticha, sessilia, crassa, obovata vel oblanceolata, apice acuta, mucronata, nervis multis obscuris parallelis, utrinque argenteo-vel fulvo-sericea, ad 15 mm. longa, 5 mm. lata. *Spicae* terminales pedunculatae, 5–12 cm. longae, circiter 1 cm. latae, rhachi sericeo-villosa; bractae ovatae, acuminatae, sericeo-villosae, primum conspicuae, cito deciduae. *Calyx* minimus, fructifer haud clausus, labio superiore perbrevis truncato vel obscure tridentato, inferiore inflexo, tubo villosus. *Corolla* parva, inconspicua, labio superiore reflexo extus villosus, inferiore vix longiore porrecto. *Stamina* paullo exserta. *Nuculae* minimae.

S. INDIA. Pulney Hills, new road, Kodaikanal Ghát, 1897-1898, *Bournes* 885\*, 1441; Lidcot Valley, Kodaikanal, July, 1898, *Bournes* 1036\*.

1089. *Teucrium plectranthoides* Gamble [Labiatae-Ajugoi-deae]; species eximia, aliis Indiae meridionalis speciebus haud affinis, fere glabra, floribus oppositis in racemis paniculatis laxis bracteatis.

*Herba* erecta, ad 50 cm. alta, ramis tetragonis fere glabris. *Folia* ovata, acuta, basi subcordata, serrata, supra et subtus minute pubescentia, ad 6 cm. longa, 4 cm. lata, nervis utrinque 5-6; petiolus gracilis, 1-1.5 cm. longus. *Flores* in racemis laxis paniculatis ramulos terminantibus, bracteis inferioribus foliis similibus, superioribus lanceolatis deciduis. *Calyx* 10-nervius, ad 5-6 mm. longus, reticulatus, sparsim glandulosus, dente posteriori rotundato, lateralibus 2 triangularibus, anterioribus 2 lanceolatis acuminatis reliquis paullo longioribus. *Corolla* elongata; tubus calyci aequalis; labium inferius aliquando ad 1 cm. longus, lobis superioribus acuminatis reflexis, 2 mediis acutis, inferiori cymbiformi. *Stamina* longe exserta cum stylo gracili. *Fructus* ignotus.

S. INDIA. Tinnevely District: Sengalteri, Sept. 25, 1916, *Herb. Madras*. 13603.

1090. *Selaginella rivalis* Ridl. [Lycopodiales-Selaginelleae]; affinis *S. Ridleyi* Baker sed foliis pallidioribus remotioribus nec ciliatis distinguitur.

*Herba* parva prostrata, caule tenui radicoso 15 ad 20 cm. longo. *Folia planitieii superioris* ovata, obtusa, apicibus rotundata, glabra, junioribus ad apices exceptis saepe marginibus ciliatis, 2 mm. longa. *Folia planitieii inferioris* ovata, acuminata, dimidio illorum, junioribus marginibus ciliatis, terminalibus subulato-cuspidatis haud obtegentibus; spicae 6 mm. longae, bracteae similes, lanceolatae, acuminatae, sporangiis pro planta majusculis.

MALAY PENINSULA. Selangor: Ulu Gombak, banks of streams in forest, *Ridley*.

This species belongs to the group *Stachygynandreae* and is most closely allied to *S. Ridleyi* Baker, a species growing on rocks in streams on Mount Ophir, but the leaves in this almost aquatic species are much closer set, ciliate and of a dark green, whereas in *S. rivalis* they are distant and of a pale colour.

### XXX.—MISCELLANEOUS NOTES.

MR. W. J. BEAN.—His Majesty has been graciously pleased to appoint Mr. W. J. Bean, Curator of the Gardens, to be a Companion of the Imperial Service Order.

MR. E. DOWNES.—We learn that Mr. E. Downes, Assistant Superintendent of Public Gardens, has been appointed Horticulturist, Department of Agriculture, Jamaica (*K.B.* 1920, p. 368).



**South African Horticultural Exhibit at Wembley.**—One of the most interesting horticultural exhibits at the British Empire Exhibition, Wembley, is the large collection of succulent plants in the South African section.

The Government of the Union of South Africa in conjunction with Sir William Hoy are to be congratulated on sending such a representative collection of their native succulent plants, the collection and packing of which must have entailed a great deal of care and trouble. The plants had been carefully packed in 118 cases of various sizes, and when unpacked appeared almost as fresh as when collected. They arrived early in March when most unfortunately the weather was very cold so that several of the more interesting specimens suffered a good deal of damage. This, especially, was noticeable with the larger Aloes, many of them being killed.

Mr. Frith, Horticulturist to the South African Railways, is in charge of this exhibit, and he has made a magnificent rockery to accommodate the plants. The building of the rockery alone was no small undertaking, as 700 loads of soil and nearly 50 tons of rock have been used, a few of the larger boulders weighing not less than half-a-ton. Mr. Frith has, with great success, endeavoured to imitate the natural surroundings in which these plants grow in South Africa, which is usually in stony ground. Apart from the large rockery in the open there is a smaller one under cover, in which many of the choice species are planted.

This very unique collection comprises many new and rare plants, several of which have never been in cultivation in this country. Perhaps the most striking feature on the large rockery is the fine specimens of the "Elephants-foot", *Testudinaria elephantipes*, probably centuries old. The sphæroid group of Mesembryanthemums is well represented, including such species as *M. Lesliei*, *M. gibbosum*, *M. digitiforme*, *M. pygmaeum*, *M. Bolusii*, and many others. Other curious and interesting plants are the Sarcocaulons, Hoodias, succulent Pelargoniums, *Euphorbia obesa* and *E. multiceps*. Among Cotyledons is a large specimen of *C. paniculata*. This remarkable plant is about 3 feet high, the large fleshy stem at the base being 9 inches in diameter.

There are many other remarkable plants in this exhibit, and anyone interested in these peculiar plants should take the opportunity to inspect them. It is gratifying to learn that the authorities have arranged to present this valuable collection of plants to Kew at the close of the exhibition.

W. T.

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**Ancient Cotton Fabrics.**—Mr. R. E. Massey communicated a note on the Ancient Cotton Fabrics in the Sudan, which appeared in the *Kew Bulletin* 1924, p. 76. The following by the same author is reprinted by permission from Sudan Notes and Records, December, 1923.

"In the course of his recent excavations in the western

pyramid field at Meroe Dr. Reisner discovered various textiles which proved on microscopic examination to be woven of cotton. Textiles very similar in appearance were found some years ago at Karanog by Messrs. Randall-MacIver and Woolley, and there can be little doubt that these also, though described by the discoverers as linen\*, are really cotton. It is thought that a brief note on the early history of cotton in Egypt and the Sudan may be of interest.

"We understand that the tombs at Meroe where these cotton fabrics were found belong to the Greco-Roman period, but there is some evidence that the cotton plant was known in Upper Egypt at a much earlier date. De Candolle† in his "Origin of Cultivated Plants" mentions that Parlatore, an Italian botanist, affirms that the seeds found by Rosellini in a Theban tomb of the New Empire were obtained from the tree Cotton, *Gossypium arboreum*, Linn. De Candolle adds that as no sign of the cultivation of cotton in Egypt is found either in the writings of early historians, or on the carvings of monuments the seeds must have been considered as a rarity 'peut être le produit d'un arbre cultivé dans le jardin, ou encore elles pouvaient venir de la Haute Egypte, pays ou nous savons que le cotonnier arborescent est sauvage'. Balls states however that Fletcher visited Florence in 1908, where these seeds were said to be deposited, and failed to trace them.

"The earliest literary reference to the use of cotton for textiles known to me is given by Herodotus (450 B.C.), Book III. Chapter 106, who in an account on the invasion of India by Darius (circ. 521 B.C.) writes as follows: 'And further there are trees which grow there, the fruit whereof is a wool exceeding in beauty and goodness that of sheep. The natives make their clothes of this tree wool'. Also in the same book, Chapter 47, when describing a corselet sent by Amasis, king of Egypt to the Lacedæmonians (569 B.C.)—'it was linen, and had a vast number of figures interwoven into its fabric, and was likewise embroidered with gold and tree wool'.

"The Egyptian priests and the Egyptian embalmers, according to the same author, used linen, but there is no doubt that cotton also was known in various parts of the ancient world at a very early period. The first good description of the plant is given by Theophrastus‡ who describes a wool-bearing tree: 'They say that the island (Tylos = Bahrein in the Persian Gulf) also produces the wool-bearing tree in abundance. This has a leaf like the vine, but small and bears no fruit, but the vessel in which the wool is contained is as large as a spring apple, and closed, but when it is ripe, it unfolds and puts forth the wool of which they weave their fabrics'. Again, 'They plant them in

\* Karanog, Philadelphia, 1910, p. 27.

† De Candolle, L'Origine des Plantes Cultivées, 1882.

‡ Theophrastus, Historia Plantarum, Heinemann, 1916, iv. vii—7-8 and iv 5-8.

the plains in rows, wherefore seen from a distance they look like vines'.

"Other descriptions which may be quoted are given by Pliny in the 1st century of our era and by Julius Pollux in the 2nd century. Pliny writes:—'They call these trees *Gossypinum*. *Tylos*, the lesser, which lies ten miles away is even more fertile. . . but the trees of Arabia, from which they make their garments are called *Cynae* with a leaf like a palm'. And in his description of Ethiopia Pliny says 'The Upper part of Egypt towards Arabia (i.e. the Sudan) produces a herb which is called *Gossypion*, or more generally *Xylon*, and the fabrics made from it, *Xylina*. It is a small plant and carries a fruit resembling the bearded nut in the outer husk of which the wool is borne. It is not to be surpassed in softness of touch or texture and whiteness withal. Garments made from it are worn for preference by the Egyptian priests'. Julius Pollux writes:—'Byssine cloths and byssus are a kind of linen of the Indians. And even now a kind of wool is made by the Egyptians from a tree, cloths of which wool one might compare to linen except as regards thickness. The fruit grows even more thickly on the tree, like a nut with three divisions. This breaks open, when the seed is dried up, and a sort of wool is taken from inside from which the thread is made. They weave this with a warp of linen.'

"The literary evidence is thus enough to show that cotton was well known in antiquity in India, in the Persian Gulf and in Ethiopia, and Virgil refers to it in an interesting passage in the *Georgics*, Book ii. v. 116 ff.

*Divisae arboribus patriae. Sola India nigrum  
Fert hebenum ; solis est turea virga Sabaeis :  
Quid tibi odorato referam sudantia ligno  
Balsamaque et bacas semper frondentis acanthi ?  
Quid nemora Aethiopum molli canentia lana ?  
Velleraque ut foliis depectant tenuia Seres ?*

"There is another interesting reference to cotton in the well-known inscription of Aizana, King of Axum about 350 A.D. The King describes in his monument a successful raid which he had conducted against the Ethiopians. He sacked 'Both towns of masonry and towns of grass huts, and sent expeditions up and down the Nile from the point of its junction with the Atbara. He seized their grain and their bronze and their iron and their copper, (?) destroyed their figures in their temples, and their implements for cultivating (?) *dura* and *cotton*' \* (the word used for cotton in the Ethiopian version being the modern Abyssinian word). Though Meroe is not mentioned by name in this inscription, there has never been any real doubt that the reference is to Meroe, and the discovery of a fragment of an Ethiopian inscription by Prof. Sayce on the site of Meroe has settled the reference finally.

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\* Crowfoot. The Island of Meroe, 1911, p. 37.



"That the industry lasted on into the medieval period we know from a reference in Abu Saleh to the capture of a large quantity of cotton at Ibrim in Lower Nubia by Turan Shah the brother of Saladin in 1172-3. \*

"More than three hundred years later Pierre Belon, a French naturalist (A.D. 1517-1564) who travelled extensively in Egypt and the Near East (1546-9 A.D.) found the cotton tree in Arabia near Mt. Sinai, and mentions that the Arabs made cloth from the fibre, but apparently he did not see the plant in Egypt.

"A most interesting reference for our purpose is in a curious volume on Egyptian Plants by Prosper Alpinus †, in which a quaint illustration is found of *Gossypium arboreum*, Gotnem segiar (i.e., Tree Cotton Qutn esh shegar). Alpinus states definitely that the cotton used in Egypt is imported from abroad, but that there exists in Egypt a tree cotton which is grown only in gardens. The 'wool' of this same tree cotton is used in Arabia to make those fine fabrics (believed to be the byssus of the ancients) which are commended by all for their beauty.

"With Prosper Alpinus we enter into the modern stage; his evidence was required merely to strengthen the conclusions arrived at from the evidence of earlier writers that the cotton industry entered Egypt from the Sudan rather than *vice versa*. Whether the material found by Dr. Reisner was spun from the indigenous Tree Cotton or was imported from abroad is at present uncertain; from analogy with present day methods there is no reason why the short coarse hairs of the indigenous cotton should not have been employed in the manufacture of the fabrics so wonderfully preserved in the pyramids of Meroe."

**The Cultivated Evergreens.** ‡.—Although this book was primarily written for horticulturists in the United States and Canada, it contains a great deal of information that is applicable to other countries and should be included in general horticultural libraries. It is composed of a number of articles by different authors under the editorship of Mr. L. H. Bailey, the eminent exponent of American Horticulture, and is divided into four parts. Part 1 deals with the landscape effect of evergreens, cultivation, adaptation of Conifers, and diseases. In this part it is probable that the chapter on diseases will be found to be of the greatest general importance. Insect pests and control measures are described by Mr. C. R. Crosby and Mr. J. B. Palmer of Cornell University, and fungus diseases by Mr. F. Dickson of the same institution. In each case a good deal of sound information is given with the omission of unnecessary detail. In part 2, descrip-

\* MacMichael. History of the Arabs, i. p. 176.

† De Plantis Aegypti, Venice, 1592.

‡ The Cultivated Evergreens; A Handbook of the Coniferous and most Important Broad-leaved Evergreens planted for Ornament in the United States and Canada. Edited by L. H. Bailey and published by the Macmillan Co., Ltd., London Office, St. Martin's Street. Price £1 11s. 6d. net.

tions are given of the Conifers cultivated in North America and this is the most important part of the book. The author is Mr. Alfred Rehder of the Arnold Arboretum and he occupies 164 pages with concise descriptions of the plants and their uses, together with numerous good illustrations. He has departed from the general scheme of the work by including such deciduous genera as *Larix*, *Pseudolarix*, *Ginkgo*, *Taxodium*, and *Glyptostrobus*, which is all to the advantage of the reader although it lays the title of the book open to criticism. Mr. Rehder has adopted the International System of Nomenclature, which, good as it is in many ways, has serious defects from a horticultural standpoint. By rigidly following this rule it becomes necessary to alter numerous well-known specific names, which long use has practically standardised. Instances may be given in *Picea excelsa* (common spruce) which now becomes *Picea Abies*; *Araucaria imbricata* (monkey puzzle) now *Araucaria araucana*; and *Abies pectinata* (European silver fir) now *Abies alba*. Part 3 deals with certain broad-leaved evergreens and is the least satisfactory part of the book. It is not in any way comprehensive and there is no indication as to how the selection has been made. In the check list, part 4, many evergreen plants are cited which are not elsewhere described and in the descriptions we look in vain for such useful American evergreens as *Magnolia grandiflora*, *Umbellularia californica*, *Arbutus Menziesii*, *Arctostaphylos Manzanita*, *Quercus densiflora*, *Q. chrysolepis*, *Castanopsis chrysophylla*, etc. We are aware that in many parts of the North-eastern United States it is impossible to cultivate many of the evergreens that can be successfully grown in most parts of the British Isles, but that cannot be the reason for the omission of numerous decorative evergreens from this work, for Conifers are included that are decidedly tender in the south of England. Apart from this section there has been considerable care taken in the preparation of the work, the mechanical part is good, the text clear and the illustrations well executed.

W. D.

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**Tropical African Bibliography.**—In mentioning Shantz and Marbut's *Vegetation and Soils of Africa* (*K.B.* 1923, p. 410) reference was made to the valuable bibliography of African literature there cited. We have now received a copy of a bibliography of the Gold Coast.\* The early part of the work is chiefly of historical interest, but in the later pages references are grouped under subjects, and this part should be of use to agriculturists, foresters, merchants and planters. The references under each heading are arranged chronologically under the author's name, and the Index gives the direct reference to the author. In future editions or addenda it would enhance the value of the work were

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\*A Gold Coast Library, by A. W. Cardinall. Francis Edwards, London, 1924. pp. 36. Price 1s.



the subject headings also included in the Index. This is the first attempt at a complete bibliography of a tropical African Colony and supplies a long-felt need. It is realised that the compilation is by no means exhaustive, but the author is to be congratulated on having made a start, and it is hoped that future editions will be more comprehensive.

**Some Minor Products of the Larch.\***—In the *Pharmaceutical Journal* for April, 1924, there are printed two articles on minor and little known products of the Larch, namely Larch Manna and the so-called "Larch Agaric," by Professor A. Henry.

In the first paper Professor Henry has collected together a mass of interesting information with regard to the rare "Larch Manna" and allied substances.

Analysis of Larch manna has shown it to consist mainly of *Melezitose*, a rare sugar which is unknown except as a constituent of honeydew or of manna, and has not been artificially prepared.

Dr. Keller, who examined Swiss specimens, considered the manna to be simply a honeydew, excreted by aphides, from which the water has been quickly evaporated by hot sun and dry air. Normally honeydew falls to the ground as a liquid, and is quickly eaten by ants, etc., or washed away by rain. Hence it is only under exceptional circumstances that manna is formed.

In times of drought, when floral nectar is scarce, bees have been known to collect manna and honeydew as substitutes. A crystallised honey is produced, the chief constituent of which is melezitose. It is suggested by Professor Henry that such crystallised honey, may be found to provide a means of producing melezitose, which is of some importance in bacteriological work, comparatively cheaply.

The "Larch Agaric," so called by the ancients, is in reality a *Fomes*, *F. officinalis* Faull (—*F. Laricis* (Jacq.) Murr.). This fungus has been known and used medicinally from ancient times.

At present it occurs in Europe throughout the Alps, the main collecting ground being in the Southern Tyrol. In North America it is widespread, and occurs on other genera of conifers as well as Larch. A full account of its biology and uses was published by Prof. J. H. Faull, of Toronto University, in the *Transactions of the Royal Canadian Institute* (xi. Nov. 1917, p. 185).

The fruit body contains from 50 to 70 per cent. of resin, which is strongly aperient, hence the use of the fungus as a cathartic. Further agaric acid or agaricine, another constituent, causes, even in small doses, complete cessation of sweat, and is therefore used as a remedy in the night-sweats of phthisis and other diseases.

E. M. W.

\* Manna of Larch and of Douglas Fir, Melezitose and Lethal Honey. *Pharmaceutical Journal and Pharmacist*, April 12, 1924. Larch Agaric, *Ibid*, April 26, 1924.